

A SERIALY REUSABLE VIRTUAL MACHINE

ABSTRACT OF THE DISCLOSURE

5 In a virtual machine environment, a method and
apparatus for the use of multiple heaps to retain
persistent data and transient data are disclosed. The use
of multiple heaps enables a single virtual machine to be
easily resettable, thus avoiding the need to terminate and
10 start a new Virtual Machine. The use of multiple heaps
also enables a single virtual machine to retain data and
objects across multiple applications, thus avoiding the
computing resource overhead of relinking, reloading,
reverifying, and recompiling classes that have already been
15 used by previous applications. The memory hierarchy
includes a System Heap where classes are loaded, linked,
verified, initialized and compiled. Subsequent
applications reuse the classes in the System Heap and need
not go through the overhead of reloading, linking,
20 verifying and compiling them again. Applications create
their persistent or resettable objects in the 'Middleware
Heap'. The Middleware Heap is garbage collected in between
applications. Application data that are used only during
the lifetime of an application are created in the
25 'Transient Heap'. The Transient Heap is cleared after
every application. Any objects that are in the Transient
Heap and are pointed to by objects in the System or

Middleware heap will be moved into the Middleware Heap.
The use of three heaps enables garbage collection to be
selectively targeted to one heap at a time (Middleware
heap) in between applications, thus avoiding this overhead
5 during the life of an application. This provides greater
response time to the client of the application. The use of
the transient heap provides a more efficient method of
garbage collection (card marking) that enables the Virtual
Machine to quickly reset the Transient Heap. This provides
10 greater Virtual Machine throughput.